Qualitative Research: The answer to new challengers

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Abstract. I did a small description of the methods of qualitative research that were found to be the most significant: Case Studies; Ethnography; Ground Theory, Action Research. I described its origins, some characteristics, advantages and disadvantages. Finally I presented some examples, related with computer science and informatics, where qualitative methods can help doing better research. It is hoped that this article contributes to the increased interest in these matters.

Keywords: Qualitative methods, case studies, Ethnographic methods, Ground Theory, Action-Research.

1 Introduction

Scientific research methods, as science itself, have undergone changes and innovations over time. There are two main currents in scientific research: quantitative and qualitative.

The traditional quantitative research was dominant during most of human history and is associated with a more positivist view of the world. We owe it the major scientific achievements that we benefit today. Moreover, quantitative methods were developed by the exact and natural sciences (physics, math ...) and are still the most used by them. Quantitative methods are characterized by using procedures, e.g. statistical procedures, to test hypotheses that are formulated on a set of variables (which can be measured) from a sample which is chosen randomly.

Nowadays, despite all the qualities of quantitative research methods, the scientific community is increasingly interested about qualitative research methods. In general, these methods are associated with a more constructivist view of the world. Qualitative research methods have been developed by social sciences and resulted from the need to better study cultural and social phenomenons. It is characterized by Strauss and Corbin (1990) cited in [10] as "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification". Qualitative research's data primarily emerges from observation, fieldwork, interviews, questionnaires, documents, texts and the investigator's own ideas and reactions [16].

Although these two ways of doing research are substantially different, some researchers believe that they can be combined in a very positive and fruitful way. When the researcher uses more than one method of research, it says he does triangulation [5] [16]. The Artificial Intelligence community has a special interest in this approach since the formal methods of quantitative approach can contribute to a better understanding the human being behavior in his "day-to-day" activities, although the study of human behavior is closely related with qualitative research, [5].

All scientific areas use some kind of scientific research method; some areas work mainly with quantitative methods (e.g. exact sciences) and others take advantage of qualitative methods to explain phenomena's (e.g. social sciences). In the field of informatics, specifically in information systems, qualitative methods are already used for quite some time: Case Study, Ethnography; Ground Theory; Action-Research. In the next sections I'll make a brief characterization of each one with reference to their origins.

2 Case Study Method

The history of Case Study method is marked by periods of intense use and periods of disuse [23]. The first records of applying this method came mainly from France. Between 1900 and 1935, the Department of Sociology at the University of Chicago stood out in using this methodology [23]. Among the researchers who are more stressed by using this methodology are Robert E. Stake, Robert K. and Helen Simons Yin [20]. Yin (1994), cited in [16], defines the essence of Case Study: an empirical study that investigates a contemporary phenomenon in real life, especially when the boundaries between the phenomenon and its context are not clear.

Yin, cited in [23], in order to better organize and conduct the research, recommends the definition of a work plan, defining:

- Objective of study;
- Its propositions, if any;

- Analyze the information;
- Analyze the logical connections between data and propositions;
- Criteria for interpreting the data.

In spite of being a positivist researcher, Yin uses qualitative research methods. This helps to understand why she proposed the establishment of logical connections between collected data and propositions.

This method, depending on the situation, can be applied to study one or several cases. A frequent criticism is that the production of general conclusions is undermined by studying a single case [23]. About this, Yin, cited in [23], counter saying that the study of two, ten or one hundred cases doesn't change the nature of the conclusions nor the ability to generalize. This is achieved by establishing criteria and implementing them throughout the study and thus even a single case is sufficient to sustain our conclusions.

Another important issue that arises when discussing Case Study is the validity and accuracy of results. One way to solve this problem, pointed by Tellis, is to use triangulation. This can happen at several levels: in the information, in the researchers, in theories and even in methods [23]. The importance of the validity and accuracy problems is due to the qualitative nature of the information involved. Thus, the results obtained are influenced by the underlying subjectivity of those implicated in the research, including the researcher himself!

3 Ethnographic Method

Ethnographic research method was initially adopted by the anthropologist Bronisław Malinowski, who published his now famous book "Argonauts of the Western Pacific" in 1922 [9].

The methods that were practiced at the time advocated that, after observe a particular phenomenon, the anthropologist tried to explain it by comparing with other similar phenomena in other cultures. Furthermore, Malinowski suggested that the cultural practices of each society could only be understood by studying the context where it belong [9]. In other words, he advocated that the researcher had to go to the field, live the day to day with the players of the phenomenon and with their surroundings, to finally have a deep enough knowledge about the problem.

Several definitions can be found for Ethnographic research method. Spradley (1980) cited in [14] describes it as the study of both explicit and tacit cultural knowledge. That is, the real challenge for the researcher is to obtain the knowledge that people have no awareness

of having, since the explicit knowledge is relatively easy to obtain [14]. Although this method has some similarities with the Case Study methodology there is a substantial difference that is described by Yin (1994) cited in [15] as: "the main difference between Case Study research and the Ethnographic research is the extent to which the researcher immerses himself or herself in the life of the social group under study". The main sources of information on case studies are interviews that are complemented by documents such as reports, minutes of meetings, etc. In Ethnographic methods, these sources are supplemented with participatory observation.

The main advantage of this method is that produces very "in depth" studies on the concerned problem. For Michael D. Myers [15], it is the most thorough and intensive method of research and adds that ethnography often lead the researcher to question what we "take for granted".

Like all other methods ethnography has also some disadvantages. One of these is a consequence of its main advantage: by definition the study is deep, thus take a long time! Because of this Myers states that for most people the best time to do Ethnographic research is at one's doctoral studies [15], since is less pressed by the time factor. Another constraint is that the researcher only studies one organization or culture which can lead to a limited study.

Once again we can put the question of the legitimacy to make generalizations. Like in Case Study research method, where it's possible to make generalizations from a single case, Myers argues that the same arguments can be applied here.

It should be noted that even Myers [9] considers that Ethnographic method can be "devastating" for researchers with less experience. They can't go with work plans and pre defined questions to the "ground" since the information that they'll collect is not predictable.

Regarding the accuracy and validity, the achievement of these objectives depends on the adoption of criteria to collect, store and analyze the information. In [15] Myers point out some basic rules and list some references literature about this subject.

4 Ground Theory Method

The Ground Theory was developed by Anselm Strauss and Barney Glaser and emerged from a study of patients in a terminal state. The method used by Strauss and Glaser is essentially a "general method of comparative analysis" [7]. According to Strauss the generation of valid knowledge results from the information collected on the ground, and nothing more. That way the knowledge becomes irrefutable since it come out only from

data. From these data, the researcher defines categories or properties that are used to demonstrate a concept. Straus states that the creation of a “theory” doesn’t require the study of many cases. One single case can be used to generate conceptual categories, and some more cases are used to confirm/illustrate the concept. The role of the researcher is not to provide a perfect description of a particular area but to develop a “theory” that matches for the most relevant part of the behavior [7].

In addition of arguing that all knowledge emanates from data, Glaser and Straus argued that the researcher should go to the "research field" without having knowledge of the theories or experiments made previously about the subject in analysis. They defend that, with any previous knowledge the researcher attempts to adjust the data to some existing theory and thus he’ll distort the truth.

Ground Theory is generated mainly by qualitative data but the authors admit the use of quantitative information [12]. Glaser goes further and says that can be used all sorts of data and all information may be relevant to determine the conceptual categories and their properties [8].

Katy Charmaz (2000) states in her book that the “constructivist Ground Theory" is the best way to bring qualitative methods for the 21st century. To refute this statement Glaser, in [8], explains why the Ground Theory is not constructive saying that "constructivist information", if this exists, is just a small part of the information used by Ground Theory.

Despite the criticisms made about Ground Theory, it was and still is a method widely used in scientific research, although not often used in its pure form. According to Samik-Ibrahim [18], makes sense to use this method is in developing countries, mainly because:

1 - The number of books and printed documentation in libraries is lower and the pressure to publish on the academic community is lower. Master and doctoral thesis are often the only seriously publications of the entire career of the researcher;

2 - The economic factor is particularly problematic. Thus the available funds to do research are limited, which leads to be more likely to adopt a cheaper research method.

5 Action-Research Method

The Action-Research originated in two different initiatives: one led by Kurt Lewin's from the Research Center for Group Dynamics in University of Michigan and the other led by a group of the Tavistock Institute whom developed a similar approach and used it to study psychological and social disorders among veterans and prisoners of war [4].

According to Cunha P. R., in [4], the philosophy of Action-Research can be characterized as follows: first we plan the outline of the intervention to be implemented (Planning), then we implement certain actions that will cause changes in the concerned situation (Action) and finally we carried out critical analysis of the results that, we hope, helps to improve the understanding of the situation and adjust the activities for the following cycles (Reflection). This process allows to start the study with a basic problem with fuzzy boundaries and converges to a solution as the knowledge is growing from cycle to cycle.

Figure 1 illustrates the situation described:

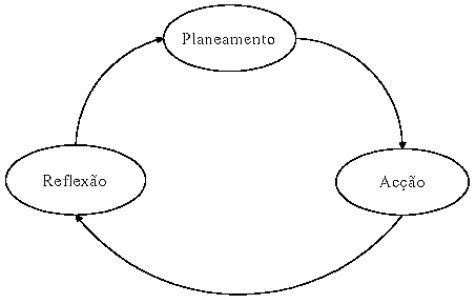

Figure 1 (From [4])

Although this is the general philosophy that guides the practice of Action-Research, there are some authors that identify different types of Action-Research depending on the subject of study, on the problem's approach, on the actors' role, etc. [17].

Action-Research started to be used mainly by the social sciences (as other methods) but nowadays is more widespread. Baskerville (1999), cited in [4], considers that Action-Research is "one of the few research methods that can be legitimately used to study the effects of changes in specific methodologies for developing systems in organizations (involving the human being)."

6 Qualitative Research an Computer Science

Nowadays, qualitative research is extensible used in many areas of knowledge and Computer Science and Informatics are not exceptions. However, there are some areas that embraced these methodologies sooner than others, e.g., Information Systems and Artificial Intelligence.

Information Systems evolved greatly in the last few years: from a way to automate some routine tasks to a very complex systems that form the backbone of large companies/entities. In practice this systems are formed by many sub-systems, which go from human resources to decision support or collaborative work systems. In order to model the complexities of these systems, researchers need new approaches. Traditional research techniques aren't enough because they can't model social interaction, cultural tendencies or other behaviors that we can't explain by a number or statistical measure. Qualitative research gives instruments to understand the dynamics of relations between the several entities/persons involved in the system and to incorporate that knowledge in to the resultant Information System. So, everyone can relate more easily with this information system and therefore use it in a more natural and efficient way.

Artificial Intelligence community, as a result of its efforts to model human reasoning, had developed a close interest in classificatory practices. The more formal methods of quantitative work can contribute to a better understanding of how people make fundamental distinctions in the course of everyday practical reasoning. But the community of Artificial Intelligence soon realized that to fully understand and model a human being they need to understand how the environment influence him and how social relations change the way he look at things. Not everything humans do is rational and logic, so it's not easy to model a human based only in a set of fixed deterministic rules. Qualitative research can help to understand and model human behavior in order to build, for instance, a more realistic automaton that can act and communicate more like humans or even learn.

Computer simulation is another area that can benefit greatly from qualitative research. In order to simulate a social phenomenon we have to fully understand it, for instance, its characteristics, how the environment is affected, and what dynamics are created, etc. Agent base simulation is a growing research area that can help many other research areas that will also benefit from qualitative research.

7 Conclusion

The traditional quantitative methods alone were not sufficient to meet the new challenges of science due to the changes in society and in organizations. This contributed to spread the application of qualitative methods. The increasing application of those last methods raised questions about how to ensure the validity, accuracy and the ability to make generalizations. In all the above presented methods, were established rules and procedures to ensure, somehow, the accuracy and validity. Nevertheless some authors argued that, if was necessary or found relevant (and with due care), we could use both quantitative and qualitative methods (making the so call "triangulation") to facilitate the generalizations and formulate a more consistent "theory".

Moreover, Karl Poper, cited in [4], about the problem of validity, stated that to scientifically validate a theory it must be both rebuttable and rejected. In other words, the "theory" should be prone to verification or confrontation with facts that expose it to be considered false and will remain scientifically valid until that illegitimacy will not be proved.

Qualitative and quantitative methods are substantially different but that doesn't mean that some are good and others bad. Markus (1997), quoted in [15], states that the war between qualitative and quantitative methods ended… The researcher can choose a set of methods, qualitative and/or quantitative, and the challenge is to choose those whom are best suited to each situation.

Like the researcher's work influences the world, the world should also influence the researcher's work. So, we should always be paying special attention to new ways of doing research and the arising of new sources of information and knowledge.

With this article I just wanted to give an overview of the most significant qualitative research methods. There are much more to say about the qualitative methods, but I hope this article could be a starting point for a deeper reading.

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